United Nations

FCCC/ARR/2014/MCO

Framework Convention on Climate Change

Distr.: General
6 February 2015

English only

Report on the individual review of the annual submission of Monaco submitted in 2014*

* In the symbol for this document, 2014 refers to the year in which the inventory was submitted, and not to the year of publication.

GE.15-01953 (E)

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Contents

		Paragraphs	*Page*
I.	Introduction and summary	1–6	3
II.	Technical assessment of the annual submission	7–90	7
	A. Overview	7–29	7
	B. Energy	30–43	13
	C. Industrial processes and solvent and other product use	44–55	17
	D. Agriculture	56–57	19
	E. Land use, land-use change and forestry	58–65	20
	F. Waste	66–72	21
	G. Supplementary information required under Article 7, paragraph 1, of the Kyoto Protocol	73–90	22
III.	Conclusions and recommendations	91–92	27
	A. Conclusions	91	27
	B. Recommendations	92	28
IV.	Questions of implementation	93	31

Annexes

I.	Information to be included in the compilation and accounting database	32
II.	Documents and information used during the review	37
III.	Acronyms and abbreviations	39

I. Introduction and summary

1. This report covers the review of the 2014 annual submission of Monaco, coordinated by the UNFCCC secretariat, in accordance with the "Guidelines for review under Article 8 of the Kyoto Protocol" (decision 22/CMP.1) (hereinafter referred to as the Article 8 review guidelines). The review took place from 22 to 27 September 2014 in Bonn, Germany, and was conducted by the following team of nominated experts from the UNFCCC roster of experts: generalist – Mr. Domenico Gaudioso (Italy); energy – Ms. Kristien Aernouts (Belgium), Mr. Sangay Dorji (Bhutan) and Ms. Diana Barba (Colombia); industrial processes and solvent and other product use – Mr. Menouer Boughedaoui (Algeria) and Mr. David Kuntze (Germany); agriculture – Mr. Daniel Bretscher (Switzerland) and Mr. Jacques Kouazounde (Benin); land use, land-use change and forestry (LULUCF) – Ms. Rehab Hassan (Sudan), Ms. Thelma Krug (Brazil), Mr. Eiichiro Nakama (Japan) and Ms. Sekai Ngarize (United Kingdom of Great Britain and Northern Ireland); and waste – Ms. Anke Herold (European Union) and Ms. Violeta Hristova (Bulgaria). Mr. Boughedaoui and Mr. Gaudioso were the lead reviewers. The review was coordinated by Ms. Sevdalina Todorova (UNFCCC secretariat).

2. In accordance with the Article 8 review guidelines, a draft version of this report was sent to the Government of Monaco, which made no comment on it. All encouragements and recommendations in this report are for the next annual submission, unless otherwise specified. The expert review team (ERT) notes that the 2013 annual review report of Monaco was published after 15 April 2014, which may have affected the Party's ability to implement recommendations and encouragements made in the previous review report.

3. All recommendations and encouragements included in this report are based on the ERT's assessment of the 2014 annual submission against the Article 8 review guidelines. The ERT has not taken into account the fact that Parties will prepare the submissions due by 15 April 2015 using the revised "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual greenhouse gas inventories" (hereinafter referred to as the UNFCCC Annex I inventory reporting guidelines) adopted through decision 24/CP.19. Therefore, when preparing the 2015 annual submissions, Parties should evaluate the implementation of the recommendations and encouragements in this report, in the context of those guidelines.

4. In 2012, the main greenhouse gas (GHG) emitted by Monaco was carbon dioxide (CO_2), accounting for 89.0 per cent of total GHG emissions[1] expressed in CO_2 equivalent (CO_2 eq), followed by hydrofluorocarbons (HFCs) (6.8 per cent), nitrous oxide (N_2O) (3.2 per cent) and methane (CH_4) (0.8 per cent). Perfluorocarbons (PFCs) and sulphur hexafluoride (SF_6) collectively accounted for 0.2 per cent of the overall GHG emissions in the country. The energy sector accounted for 91.5 per cent of total GHG emissions, followed by the industrial processes sector (7.0 per cent), the waste sector (1.4 per cent) and the solvent and other product use sector (0.1 per cent). The agriculture sector was reported as not occurring ("NO"), not applicable ("NA"). Total GHG emissions amounted to 93.47 Gg CO_2 eq and decreased by 14.9 per cent between the base year[2] and 2012. The

[1] In this report, the term "total GHG emissions" refers to the aggregated national GHG emissions expressed in terms of CO_2 eq excluding LULUCF, unless otherwise specified.

[2] "Base year" refers to the base year under the Kyoto Protocol, which is 1990 for CO_2, CH_4 and N_2O, and 1995 for HFCs, PFCs and SF_6. The base year emissions include emissions from source categories included in Annex A to the Kyoto Protocol only.

ERT concluded that the description in the national inventory report (NIR) of the trends for the different gases and sectors is reasonable.

5. Tables 1 and 2 show GHG emissions from categories included in Annex A to the Kyoto Protocol (hereinafter referred to as Annex A sources), emissions and removals from the LULUCF sector under the Convention and emissions and removals from activities under Article 3, paragraph 3, and, if any, elected activities under Article 3, paragraph 4, of the Kyoto Protocol (KP-LULUCF), by gas and by sector and activity, respectively.

6. Information to be included in the compilation and accounting database can be found in annex I to this report.

Table 1

Greenhouse gas emissions from Annex A sources and emissions/removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol by gas, base year[a] to 2012

			Gg CO_2 eq								*Change (%)*	
		Greenhouse gas	*Base year*	*1990*	*1995*	*2008*	*2009*	*2010*	*2011*	*2012*	*Base year*	*2012*
Annex A sources		CO_2	105.47	105.47	111.85	90.07	85.40	82.43	79.20	83.22		−21.1
		CH_4	1.84	1.84	1.08	0.80	0.76	0.74	0.74	0.77		−58.4
		N_2O	1.78	1.78	2.77	3.05	2.94	2.75	2.73	2.93		65.0
		HFCs	0.53	0.29	0.53	6.10	6.14	6.26	6.99	6.39		1 099.7
		PFCs	IE, NA, NO	IE, NA, NO	IE, NA, NO	0.02	0.02	IE, NA, NO	IE, NA, NO	IE, NA, NO		NA
		SF_6	0.19	0.18	0.19	0.16	0.16	0.16	0.16	0.16		−13.1
KP-LULUCF	Article 3.3[b]	CO_2				NA	NA	NA	NA	NA		
		CH_4				NA	NA	NA	NA	NA		
		N_2O				NA	NA	NA	NA	NA		
	Article 3.4[c]	CO_2	NA			NA	NA	NA	NA	NA	NA	NA
		CH_4	NA			NA	NA	NA	NA	NA	NA	NA
		N_2O	NA			NA	NA	NA	NA	NA	NA	NA

Abbreviations: Annex A sources = source categories included in Annex A to the Kyoto Protocol, IE = included elsewhere, KP-LULUCF = land use, land-use change and forestry emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, NA = not applicable, NO = not occurring.

[a] The base year for Annex A sources refers to the base year under the Kyoto Protocol, which is 1990 for CO_2, CH_4 and N_2O, and 1995 for HFCs, PFCs and SF_6. The base year for cropland management, grazing land management and revegetation under Article 3, paragraph 4, of the Kyoto Protocol is 1990. For activities under Article 3, paragraph 3, of the Kyoto Protocol and forest management under Article 3, paragraph 4, only the inventory years of the commitment period must be reported.

[b] Activities under Article 3, paragraph 3, of the Kyoto Protocol, namely afforestation and reforestation, and deforestation.

[c] Elected activities under Article 3, paragraph 4, of the Kyoto Protocol, including forest management, cropland management, grazing land management and revegetation.

Table 2
Greenhouse gas emissions by sector and activity, base year[a] to 2012

			Gg CO_2 eq								*Change (%)*
		Sector	*Base year*	*1990*	*1995*	*2008*	*2009*	*2010*	*2011*	*2012*	*Base year–2012*
Annex A sources		Energy	108.31	108.31	114.52	92.72	87.79	84.61	81.45	85.53	–21.0
		Industrial processes	0.72	0.47	0.72	6.28	6.32	6.42	7.15	6.56	808.8
		Solvent and other product use	0.03	0.03	0.06	0.09	0.09	0.07	0.08	0.09	206.8
		Agriculture	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA, NO	NA
		Waste	0.75	0.75	1.12	1.11	1.23	1.25	1.14	1.29	71.4
		LULUCF	NA	–0.01	–0.01	–0.02	–0.02	–0.02	–0.02	–0.02	NA
		Total (with LULUCF)	**NA**	**109.55**	**116.41**	**100.19**	**95.39**	**92.33**	**89.80**	**93.45**	**NA**
		Total (without LULUCF)	**109.81**	**109.56**	**116.42**	**100.21**	**95.42**	**92.35**	**89.82**	**93.47**	**–14.7**
		Other[b]	NA	NA	NA	NA	NA	NA	NA	NA	NA
KP-LULUCF	Article 3.3[c]	Afforestation and reforestation									
		Deforestation									
		Total (3.3)				**NA**	**NA**	**NA**	**NA**	**NA**	
	Article 3.4[d]	Forest management				NA	NA	NA	NA	NA	
		Cropland management	NA			NA	NA	NA	NA	NA	NA
		Grazing land management	NA			NA	NA	NA	NA	NA	NA
		Revegetation	NA			NA	NA	NA	NA	NA	NA
		Total (3.4)	**NA**			**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

Abbreviations: Annex A sources = source categories included in Annex A to the Kyoto Protocol, KP-LULUCF = LULUCF emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, LULUCF = land use, land-use change and forestry, NA = not applicable, NO = not occurring.

[a] The base year for Annex A sources is the base year under the Kyoto Protocol, which is 1990 for CO_2, CH_4 and N_2O, and 1995 for HFCs, PFCs and SF_6. The base year for cropland management, grazing land management and revegetation under Article 3, paragraph 4, of the Kyoto Protocol is 1990. For activities under Article 3, paragraph 3, of the Kyoto Protocol and forest management under Article 3, paragraph 4, only the inventory years of the commitment period must be reported.

[b] Emissions/removals reported in the sector other (sector 7) are not included in Annex A to the Kyoto Protocol and are therefore not included in national totals.

[c] Activities under Article 3, paragraph 3, of the Kyoto Protocol, namely afforestation and reforestation, and deforestation.

[d] Elected activities under Article 3, paragraph 4, of the Kyoto Protocol, including forest management, cropland management, grazing land management and revegetation.

II. Technical assessment of the annual submission

A. Overview

1. Annual submission and other sources of information

7. The 2014 annual submission was submitted on 15 April 2014; it contains a set of common reporting format (CRF) tables for the period 1990–2012 and an NIR (submitted on 30 June 2014). Monaco further submitted revised CRF tables and a revised NIR on 4 September 2014. Monaco also submitted the information required under Article 7, paragraph 1, of the Kyoto Protocol, including information on: activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, accounting of Kyoto Protocol units, changes in the national system and in the national registry and the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol. The standard electronic format (SEF) tables were submitted on 14 April 2014. Given the late submission of the NIR, the annual submission was not submitted in accordance with decision 15/CMP.1 (see para. 20 below). The ERT strongly recommends that Monaco submit all the elements of its next inventory by 15 April 2015, as required by decision 24/CP.19.

8. Monaco submitted revised CRF and KP-LULUCF tables on 26 September 2014, during the review week, with a minor revision of the estimates for fugitive emissions (see paras. 31 and 43 below). The values used in this report are those submitted by Monaco on 26 September 2014.

9. The list of other materials used during the review is provided in annex II to this report.

2. Questions of implementation raised in the 2013 annual review report

10. The ERT noted that no questions of implementation were raised in the 2013 annual review report.

3. Adjustment applied in a previous annual review report

11. The ERT noted that, consistent with paragraph 11 of decision 20/CMP.1, Monaco has submitted revised estimates for a category in its 2013 inventory to which an adjustment was previously applied. Specifically, Monaco submitted revised estimates for CH_4 emissions from natural gas distribution for the entire time series (1990–2012).[3] The ERT reviewed the revised estimates and requested the Party to correct a mistake concerning an emission factor (EF) (see paras. 31 and 43 below). Monaco revised the EF and submitted revised estimates during the review. The ERT concludes that the revised estimates for CH_4 emissions from natural gas distribution for the years 1990–2012 shall replace the adjusted estimate in the compilation and accounting database.

4. Overall assessment of the inventory

12. Table 3 contains the ERT's overall assessment of the annual submission of Monaco. For recommendations for improvements for specific categories, please see the paragraphs cross-referenced in the table.

[3] For a discussion of the original adjustment case, please refer to document FCCC/ARR/2013/MCO, paragraphs 99–112.

Table 3
The expert review team's overall assessment of the annual submission

Issue	*Expert review team assessment*	*General findings and recommendations*
The ERT's findings on completeness		
Annex A sources[a]	Complete	Mandatory: none
		Non-mandatory: "NE" is reported for: CO_2 emissions from asphalt roofing; potential HFC emissions from foam blowing and aerosols/metered dose inhalers; N_2O emissions from degreasing and dry cleaning, and other (printing industry, wood preservation); and N_2O emissions from industrial wastewater
		The ERT encourages the Party to estimate and report emissions from the non-mandatory categories
Land use, land-use change and forestry[a]	Complete	Mandatory: none
		Non-mandatory: "NE" is reported for CO_2 emissions from settlements remaining settlements (dead organic matter and soil organic carbon pools) and CH_4 emissions from settlements; "NO" is reported for emissions from biomass burning (see para. 61 below)
		The ERT encourages the Party to estimate and report emissions from the non-mandatory categories
KP-LULUCF	Complete	There are no KP-LULUCF activities occurring in Monaco (see table 6 below)
The ERT's findings on recalculations and time-series consistency		
Transparency of recalculations	Not sufficiently transparent	The rationale for the recalculations is provided in the NIR, but not in CRF table 8(b) (see paras. 13, 31, 45 and 67 below)
Time-series consistency	Sufficiently consistent	
The ERT's findings on QA/QC procedures	Not sufficient	Monaco has elaborated a QA/QC plan and has implemented tier 1 QA/QC procedures in accordance with that plan. However, the ERT finds that the Party's problems in ensuring consistency between different elements of the annual submission suggest that the tier 1 QC procedures are not being properly implemented. The ERT recommends that Monaco strengthen its QA/QC and verification procedures in order to avoid the occurrence of errors and inconsistencies in the reporting

Issue	*Expert review team assessment*	*General findings and recommendations*
		Please see paragraphs 15, 18, 19, 32, 40, 47, 50 and 67 below for general and category-specific recommendations
The ERT's findings on transparency	Not sufficiently transparent	The ERT notes that the transparency of the sectoral parts of the NIR is still hindered by the lack of information on the sources of emission factors and activity data, as well as on the key categories, verification and uncertainty. The ERT recommends that the Party improve the transparency of its NIR Please see paragraphs 13, 14, 32, 47, 48, 49, 51, 55, 61, 63–65 and 72 below for category-specific recommendations

Abbreviations: Annex A sources = source categories included in Annex A to the Kyoto Protocol, CRF = common reporting format, ERT = expert review team, KP-LULUCF = land use, land-use change and forestry emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, NE = not estimated, NIR = national inventory report, NO = not occurring, QA/QC = quality assurance/quality control.

[a] The assessment of completeness by the ERT considers only the completeness of reporting of mandatory categories (i.e. categories for which methods and default emission factors are provided in the Intergovernmental Panel on Climate Change (IPCC) *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories*, the IPCC *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories* or the IPCC *Good Practice Guidance for Land Use, Land-Use Change and Forestry*).

13. Monaco has reported on the recalculations performed for all sectors in section 10 of the NIR. However, the information does not provide details of the reasons for the recalculations, the years affected and the impact of the recalculations on the estimates for the category and the sector. In some cases, it is not clear if the recalculations were performed for the purposes of the resubmission of the inventory for the previous year, or whether they were performed for the current submission. The ERT therefore recommends that Monaco report the recalculations under each category and include a clear explanation of the reasons for the recalculations made in the course of previous reviews, clearly distinguishing them from the recalculations made for the purposes of the current submission. The ERT further recommends that Monaco include information on the rationale for and impact of the recalculations on the emission levels and trends in the NIR, as well as relevant summary information in CRF table 8(b) to improve the transparency of the reported recalculations.

14. In addition, the ERT found that Monaco has not provided information on planned inventory improvements, including those in response to the review process. The ERT encourages the Party to include such information both at the sectoral level and at the overall level, together with clear deadlines for the implementation of previous recommendations that are pending.

15. Annex 8 to the NIR is entitled "Other annexes – quality control procedures elaborated by Monaco".[4] However, the ERT noted that the annex contains only information on the modalities of data collection, data archiving procedures and data processing. There is no information related to quality assurance/quality control (QA/QC) procedures and the annex title is not consistent with the content of annex 8. The ERT recommends that

[4] "Annexe 8: Autre annexes – Procédures de Contrôle Qualité élaborées par la Principauté de Monaco", page 167 of the NIR.

Monaco amend the annex with information on the QA/QC and verification procedures implemented for each of the sectors.

5. Description of the institutional arrangements for inventory preparation, including the legal and procedural arrangements for inventory planning, preparation and management

Inventory planning

16. The NIR described the national system for the preparation of the inventory. As indicated by the Party in its NIR, there were no major changes to the inventory planning process. The description of the inventory planning process, as contained in the report of the individual review of the annual submission of Monaco submitted in 2013,[5] remains relevant. The Direction de l'Environnement, within the Département de l'Equipement, de l'Environnement et de l'Urbanisme, has overall responsibility for the national inventory and works with the support of private companies, public bodies and governmental institutions. An important support to the preparation of the inventory is provided by the Centre Interprofessionnel Technique de la Pollution Atmosphérique (CITEPA) of France, with regard to the selection of EFs and estimation methodologies, the provision of default activity data (AD) and the establishment and implementation of QA/QC procedures.

17. Following recommendations from previous review reports, Monaco has increased the use of country-specific data in the current annual submission for the estimates of emissions from various categories, such as fugitive emissions from oil and natural gas, and incineration of municipal solid waste (MSW) with energy recovery. Despite the increased use of country-specific data, several estimates are still based on the use of tier 1 methodologies and Intergovernmental Panel on Climate Change (IPCC) default EFs and/or parameters. The ERT reiterates the recommendation made in the previous review report[6] that Monaco strengthen cooperation with national institutions and companies in order to increase the use of available country-specific data for the preparation of the inventory in order to develop more accurate estimates.

18. A QA/QC plan has been elaborated and information on it is available in the annual submission. However, the problems encountered by the Party in ensuring consistency between different elements of the annual submission suggest that the QC procedures are not being appropriately implemented. During the review, Monaco provided additional information concerning the prioritization of inventory improvements. The ERT recommends that the Party continue updating and improving its QA/QC plan, with a view to improving the effectiveness of the QA/QC procedures. The ERT further reiterated the recommendation made in the previous review report[7] that Monaco provide information concerning the implementation of the QA/QC plan, in particular regarding the prioritization of inventory improvements on the basis of the key category analysis and the uncertainty assessment.

19. In addition, the ERT notes that the NIR refers to the fact that CITEPA provides the QA for the inventory, which the ERT considers not to be in line with the IPCC *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories* (hereinafter referred to as the IPCC good practice guidance) in view of the fact that CITEPA is also involved in the preparation of the inventory of Monaco. The ERT therefore reiterates the recommendation made in the previous review report that the Party revise the organization of the QA activities, taking into account that, in principle and in accordance

[5] FCCC/ARR/2013/MCO, paragraphs 10–11.
[6] FCCC/ARR/2013/MCO, paragraph 12(a).
[7] FCCC/ARR/2013/MCO, paragraph 12(c).

with the IPCC good practice guidance, these should not be carried out by experts involved in the preparation of the inventory.

20. As referred to in paragraph 7 above, the CRF tables were submitted on time on 15 April 2014, whereas the NIR was submitted on 30 June 2014, which means that Monaco has failed to submit an annual inventory, including the NIR and the CRF tables, within six weeks of the submission due date established by the Conference of the Parties (i.e. in this particular case, 27 May 2014). According to paragraph 3(a) of the annex to decision 15/CMP.1, this means that Monaco has failed to meet the reporting requirements under Article 7, paragraph 1, of the Kyoto Protocol for the purpose of the eligibility requirements. The ERT took note of the report of the twenty-fifth meeting of the Compliance Committee[8] with regard to the delay in the submission of Monaco's NIR. The ERT also consulted the annual submissions of Monaco for the last five years and noted that in previous years the submissions were without delay. During the review, the ERT requested the Party to explain the reasons for the delay in the submission and to provide information on actions undertaken to ensure the timeliness of the annual submission in the future. In response to questions raised by the ERT during the review, Monaco explained that the delay was due to the fact that the national system also had to deal, at the same time, with the resubmission of the inventory as a result of the 2013 in-country review, as well as the preparation of the sixth national communication and the first biennial report under the Convention. Monaco also provided information on the reinforcement of external assistance contracts in order to ensure the timeliness and quality of the reporting. The ERT welcomes the information provided by the Party on measures to strengthen the national system and recommends that Monaco implement them in a timely manner. Given the information provided by the Party, the ERT concluded that the delay in the submission of the NIR does not pose a question of implementation.

21. However, in order to avoid the occurence of problems concerning the timeliness of the annual submission, the consistency and annual update of its various elements, and the timely implementation of recommendations made in previous review reports, the ERT reiterates the recommendation[9] made in the previous review report that Monaco, in order to improve the national system, ensure that adequate resources are allocated to the preparation of the inventory.

Inventory preparation

22. Table 4 contains the ERT's assessment of Monaco's inventory preparation process. For improvements related to specific categories, please see the paragraphs cross-referenced in the table.

Table 4
Assessment of inventory preparation by Monaco

Issue	*ERT assessment*	*ERT findings and recommendations*
Key category analysis		
Was the key category analysis performed in accordance with the IPCC good practice guidance and the IPCC good practice guidance for LULUCF?	Yes	Level and trend analysis performed (see para. 23 below)

[8] CC/EB/25/2014/3.
[9] FCCC/ARR/2013/MCO, paragraph 12(b).

Issue	*ERT assessment*	*ERT findings and recommendations*
Approach followed?	Tier 1	
Were additional key categories identified using a qualitative approach?	No	
Has the Party identified key categories for activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol following the guidance on establishing the relationship between the activities under the Kyoto Protocol and the associated key categories in the UNFCCC inventory?	No	Not applicable
Does the Party use the key category analysis to prioritize inventory improvements?	Yes	See paragraph 26 below
Assessment of uncertainty analysis		
Approach followed?	Tier 1	
Was the uncertainty analysis carried out in accordance with the IPCC good practice guidance and the IPCC good practice guidance for LULUCF?	No	Monaco has provided uncertainty estimates for all sectors including the LULUCF sector (see paras. 24 and 25 below)
Quantitative uncertainty (including LULUCF)	Level = 7.1% Trend = 2.5%	
Quantitative uncertainty (excluding LULUCF)	Not provided	

Abbreviations: ERT = expert review team, IPCC good practice guidance = Intergovernmental Panel on Climate Change (IPCC) *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories*, IPCC good practice guidance for LULUCF = IPCC *Good Practice Guidance for Land Use, Land-Use Change and Forestry*, LULUCF = land use, land-use change and forestry.

23. As recommended in previous review reports, Monaco has included the full list of categories considered in the key category analysis in the NIR of its 2014 annual submission, instead of only the list of identified key categories. The ERT commends Monaco for this improvement. The ERT noted, however, that even though the key category analysis in the NIR provides both a level and trend assessment, the information in CRF table 7 includes only references to the level assessement and the N_2O emissions from road transportation have not been included in the list of key categories in the CRF tables. The ERT recommends that the Party ensure the consistent reporting of the key categories between the NIR and the CRF tables.

24. In its uncertainty analysis, Monaco presents the uncertainties as standard deviations, rather than using the 95 per cent confidence interval as recommended in the IPCC good practice guidance. The ERT reiterates the recommendation made in previous review reports that Monaco use the 95 per cent confidence interval to report uncertainties, as

recommended in the IPCC good practice guidance, to ensure comparability with the reporting of other Parties.

25. In the section of the NIR reporting the results of the uncertainty analysis, Monaco does not provide any interpretation of the trends of the uncertainty values. In response to a question raised by the ERT during the review, the Party provided a preliminary analysis of the major sources of the uncertainty for the overall inventory and of the trend of the uncertainty values for the years 2008–2012. The ERT welcomes the information presented by the Party during the review and recommends that Monaco update it and include it in its next NIR.

26. The ERT also noted that the NIR does not include any information regarding the use of the key category and uncertainty analyses to prioritize and improve the inventory activities. Such information was provided in response to a question raised by the ERT during the review. The ERT recommends that Monaco continue to use the key category and uncertainty analyses to prioritize its inventory improvement efforts in order to achieve a higher level of accuracy, and include this information in the NIR.

Inventory management

27. There were no changes to the inventory management process carried out by the Party for the 2014 annual submission, as indicated by the Party in its NIR. The description of the inventory management process, as contained in the report of the individual review of the annual submission of Monaco submitted in 2013,[10] remains relevant.

6. Follow-up to previous reviews

28. On the basis of the recommendations made in the 2013 review report, Monaco has introduced a number of improvements, in particular:

(a) A tier 3 methodology has been adopted for the estimation of CH_4 emissions from natural gas distribution;

(b) New methodologies have been introduced for HFC-134a emissions from domestic and mobile refrigeration and the EF has been revised for SF_6 emissions from electrical equipment;

(c) The description of the QA/QC procedures has been improved;

(d) All categories considered in the key category analysis have been included in the NIR.

29. However, the ERT notes that most of the cross-sectoral recommendations made in previous review reports have not yet been implemented, as specified in the paragraphs above. Recommendations from previous reviews that have not yet been implemented, as well as issues the ERT identified during the 2014 annual review, are discussed in the relevant sectoral chapters of the report and in table 9 below.

B. Energy

1. Sector overview

30. The energy sector is the main sector in the GHG inventory of Monaco. In 2012, emissions from the energy sector amounted to 85.53 Gg CO_2 eq, or 91.5 per cent of total

[10] FCCC/ARR/2013/MCO, paragraph 17.

GHG emissions. Since 1990, emissions have decreased by 21.0 per cent. The key driver for the fall in emissions is the 38.2 per cent reduction in emissions from other sectors, caused by a decrease in fuel use and the shift from consumption of liquid fuels to gaseous fuels. Within the sector, 34.1 per cent of the emissions were from transport, followed by 32.9 per cent from energy industries and 32.8 per cent from other sectors. The remaining 0.2 per cent were from fugitive emissions from oil and natural gas. Emissions from manufacturing industries and construction and fugitive emissions from solid fuels were reported as "NA, NO".

31. Monaco has made recalculations between the 2013 and 2014 annual submissions for this sector. The most significant recalculation for 2011 made by Monaco between the 2013 and 2014 annual submissions was in the following category: fugitive CO_2 and CH_4 emissions from natural gas distribution (0.18 Gg CO_2 eq). The recalculation was made in order to lift applied adjustments and correct an identified error (energy industries). Compared with the 2013 annual submission, the recalculations increased emissions in the energy sector by 0.23 Gg CO_2 eq (0.3 per cent) and increased total national emissions for 2011 by 0.3 per cent. The recalculations were not adequately explained. During the review, in response to a question raised by the ERT, Monaco provided the Excel spreadsheet with the calculations performed. An error in the CO_2 and CH_4 EFs for natural gas distribution was detected by the ERT and agreed upon by Monaco, which lead to an underestimation of emissions (see para. 43 below). Monaco resubmitted the CRF tables during the review for the whole time series. Since the recalculation was very small (0.004 Gg CO_2 eq), the total effect of the recalculations for the energy sector for 2011 remained an increase in emissions of 0.23 Gg CO_2 eq (0.3 per cent).

32. The ERT noted some improvements in the transparency of the NIR regarding the description of the AD and country-specific EFs used and in the consistency between the information in CRF summary table 3 and the NIR. However, the ERT did not find any improvements regarding the inclusion of information on the uncertainty values for the country-specific EFs, the development of a country-specific CO_2 EF for the use of waste in electricity and heat production, the inclusion of additional information on the sector-specific QA/QC procedures performed, and on the allocation of emissions between the energy and other sectors. The ERT reiterates the recommendations from the previous review report that Monaco address these issues in a timely manner.

2. Reference and sectoral approaches

33. Table 5 provides a review of the information reported under the reference approach and the sectoral approach, as well as comparisons with other sources of international data. Issues identified in table 5 are more fully elaborated in paragraphs 34–37 below.

Table 5
Review of reference and sectoral approaches

Issue	*Expert review team assessment*	*Paragraph cross references*
Difference between the reference approach and the sectoral approach	Energy consumption: 0 PJ, 0.0% CO_2 emissions: 0.28 Gg CO_2, –0.34%	
Are differences between the reference approach and the sectoral approach adequately explained in the NIR and the CRF tables?	No	34

Issue	*Expert review team assessment*	*Paragraph cross references*
Are differences with international statistics adequately explained?	Not applicable	
Is reporting of bunker fuels in accordance with the UNFCCC reporting guidelines?	Yes	36
Is reporting of feedstocks and non-energy use of fuels in accordance with the UNFCCC reporting guidelines?	No	37

Abbreviations: CRF = common reporting format, NIR = national inventory report, UNFCCC reporting guidelines = "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual inventories".

Comparison of the reference approach with the sectoral approach and international statistics

34. As already identified in previous review reports, Monaco reports the apparent consumption of MSW for incineration as "NO, NA" in CRF table 1.A(b) under "other solid fuels", but reports the amount of MSW incinerated with associated emissions in CRF table 1.A(c). The ERT reiterates the recommendation made in previous review reports that Monaco report the consumption of MSW in a consistent way in CRF tables 1.A(b) and 1.A(c).

35. The ERT acknowledges the fact that the information required to prepare the reference approach is not available for Monaco (e.g. import, export, bunkers and stock changes). The ERT reiterates the recommendation made in the previous review report that Monaco explain the difficulties in the availability of information in the NIR and try to develop methods to collect these data in order to complete the reference approach in accordance with the *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as the Revised 1996 IPCC Guidelines).

International bunker fuels

36. To separate emissions from international and domestic navigation, Monaco uses the results of a survey from 2005, showing that 91 per cent of total fuel consumption was for international navigation. The ERT reiterates the recommendation made in previous review reports that Monaco repeat the survey on a regular basis, to enhance the accuracy of the allocation of emissions between international and domestic navigation.

Feedstocks and non-energy use of fuels

37. In CRF table 1.A(d), Monaco continues to report the fuel quantity for lubricants as "NE" (not estimated), and reports all other fuel types as "NO". Nevertheless, Monaco reports emissions from road paving with asphalt under the industrial processes sector, which indicates that bitumen is used in Monaco. This issue of missing information and inconsistency between CRF table 1.A(d) and the reporting in other sectors has been raised in previous review reports. The ERT reiterates the recommendation that Monaco revise the reporting of feedstocks and non-energy use of fuels in CRF table 1.A(d) in a consistent manner under the energy and industrial processes sectors and explain in the NIR the use and disposal of lubricants in the country.

3. Key categories

Stationary combustion: liquid, gaseous, biomass and other fuels – CO_2, CH_4 and N_2O[11]

38. During the previous review, Monaco provided a significant amount of information on the incineration of MSW with energy recovery using preliminary country-specific data and higher-tier methods.[12] After considering all the information, the previous ERT concluded that the initial estimates provided using the tier 1 method and default values from the IPCC good practice guidance did not result in an underestimation of emissions. The current ERT noted that the estimates provided in the 2014 annual submission for other fuel burning under public electricity and heat production are the same as those provided in the initial 2013 annual submission. The ERT reiterates the recommendation made in the previous review report that Monaco further investigate the possibility of collecting information on the composition of the MSW incinerated and determine a country-specific EF in order to apply a tier 2 method for the category.

39. The previous review report also recommended that Monaco subtract the biomass fraction in the MSW from other fuel and report it under the corresponding biomass fuel use for the same category. The ERT reiterates this recommendation.

40. In the Party's submission of 31 October 2013, Monaco used the notation key "IE" (included elsewhere) to report the emissions from biomass under the category public electricity and heat production. In the 2014 annual submission, the AD and emissions have again been reported following the recommendation of the previous ERT and correcting the identified error. In response to a question raised by the ERT during the review, Monaco explained that these AD and emissions had been mistakenly removed from the previous submission and had now been included again in the current submission. The ERT commends the Party for this improvement in the completeness of the reporting and recommends that Monaco improve its QA/QC checks to avoid such mistakes in future annual submissions.

41. The ERT commends Monaco for providing additional information on the CO_2 EF (56.72 t/TJ) used for natural gas, as recommended by the previous review report. The NIR explains that the EF for natural gas is the one used by France. However, the ERT noted that Monaco applied an oxidation factor of 99.5 per cent, while the EF of France already has the oxidation factor included. In response to a question raised by the ERT during the review, Monaco confirmed this, but indicated that the EF used is still within the range of EFs used by other reporting Parties (range of 49.50 – 62.72 t/TJ) and higher than the default value from the IPCC good practice guidance. The ERT concluded that the EF could not lead to an underestimation of emissions, since it is constantly applied over the entire time series, but recommends that Monaco further investigate the origin of the EF and justify its use before applying it, or modify it as necessary using country-specific data.

42. Monaco reports the AD and emissions from the subcategory commercial/institutional under the residential subcategory. The allocation has no impact on total sectoral emissions and Monaco is currently unable to split the AD and emissions across the subcategories. For comparability with other Parties, the ERT reiterates the recommendation made in the previous review report[13] that Monaco make efforts to report the emissions from the commercial/institutional and residential subcategories separately.

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[11] CH_4 and N_2O emissions from this category are not key. However, since all issues related to this category are discussed as a whole, the individual gases and fuels are not assessed in separate sections.

[12] FCCC/ARR/2013/MCO, paragraphs 37–38.

[13] FCCC/ARR/2013/MCO, paragraphs 37–38.

Fugitive emissions from oil and natural gas – CH_4 and CO_2[14]

43. In response to an adjustment made by the previous ERT concerning CH_4 emissions from distribution of natural gas, Monaco has recalculated the whole time series. Monaco has based its recalculation on an EF from the "Compendium of greenhouse gas emissions methodologies for the oil and natural gas industry"[15] compiled by the American Petroleum Institute (API) in 2009. Together with a recalculation of the CH_4 emissions, Monaco included estimates of the CO_2 emissions for the entire time series in its 2014 annual submission. The ERT commends Monaco for this improvement in the completeness of its inventory. In response to a question raised by the ERT during the review concerning the use of certain EFs, Monaco provided the Excel calculation spreadsheet with the calculations performed. The ERT noted that for the calculation of CH_4 and CO_2 emissions from normal activities for the low-pressure plastic pipelines, there are no specific EFs in table 6-10 of the API report. The ERT concluded that Monaco has used an incorrect EF (expressed in emissions per service instead of emissions per length of pipeline). During the review, Monaco agreed with this observation and resubmitted the CRF tables for the whole time series with the corrected values, which the ERT accepted.

C. Industrial processes and solvent and other product use

1. Sector overview

44. In 2012, emissions from the industrial processes sector amounted to 6.56 Gg CO_2 eq, or 7.0 per cent of total GHG emissions, and emissions from the solvent and other product use sector amounted to 0.09 Gg CO_2 eq, or 0.1 per cent of total GHG emissions. Since the base year, emissions have increased by 808.8 per cent in the industrial processes sector, and increased by 206.8 per cent in the solvent and other product use sector. The key driver for the rise in emissions in the industrial processes sector is the increased consumption of fluorinated gases and SF_6, mainly HFCs and PFCs from air-conditioning equipment and SF_6 from electrical equipment. Within the industrial processes sector, nearly 100 per cent of the emissions were from consumption of halocarbons and SF_6. The remaining negligible emissions were from mineral products.

45. Monaco has made recalculations between the 2013 and 2014 annual submissions for the industrial processes sector. The recalculations made by Monaco between the 2013 and 2014 annual submissions were in the following category: consumption of halocarbons and SF_6. The recalculations were made in response to the 2013 annual review report and following changes in EFs. Compared with the 2013 annual submission, the recalculations decreased emissions in the industrial processes sector by 0.01 Gg CO_2 eq (0.01 per cent), and decreased total national emissions for 2011 by 0.01 per cent. Monaco has also reported recalculations for the solvent and other product use sector. The recalculations resulted in an increase in emissions in the solvent and other product use sector by 0.03 Gg CO_2 eq (78.1 per cent) and increased total national emissions for 2011 by 0.04 per cent. The recalculations were not adequately explained since the explanation in the NIR indicates that CO_2 emissions were included for the first time in the 2014 annual submission, which is not the case. The ERT recommends that Monaco improve the reporting on the recalculations for the industrial processes and solvent and other product use sectors by ensuring that the information is updated and by including information on the rationale for and impact of the recalculations.

[14] CO^2 emissions from this category are not key. However, since all issues related to this category are discussed as a whole, the individual gases are not assessed in separate sections.

[15] See <http://www.api.org/~/media/Files/EHS/climate-change/2009_GHG_COMPENDIUM.pdf>.

46. Monaco reports most of the mandatory categories under the industrial processes sector as "NO". The Party uses the notation key "NE" to report: CO_2 emissions from asphalt roofing; potential HFC emissions from foam blowing and aerosols/metered dose inhalers; and N_2O emissions from degreasing and dry cleaning and other (printing industry, wood preservation). Noting that there are no methodologies available for the calculation of emissions from these categories in the Revised 1996 IPCC Guidelines and the IPCC good practice guidance, the ERT encourages the Party to make efforts to include these estimates in future annual submissions.

47. Monaco has not developed a consistent QA/QC plan for the industrial processes sector. Since the AD for consumption of halocarbons and SF_6 are collected by questionnaires sent to all operators in Monaco without follow-up verification procedures, the ERT considers that the implementation of QA/QC procedures and verification by sectoral expert judgement is important for ensuring the accuracy of the estimates. The QA has to be conducted by an external body not involved in the preparation of the inventory; therefore, CITEPA is not qualified for that purpose since it is involved in the preparation of the inventory. The ERT recommends that Monaco further develop the QA/QC procedures for all categories, in order to improve the completeness and quality of the inventory. The ERT considers that the NIR is not sufficiently transparent, as all data collection is based on questionnaires which are not described in detail. The ERT recommends that Monaco report more clearly on the questionnaires used to collect data for consumption of halocarbons and SF_6 and on any QA/QC and verification procedures applied to the data to improve transparency in its next annual submission.

2. Key categories

Consumption of halocarbons and SF_6 – HFCs, PFCs and SF_6

48. Monaco reports a product life factor of 0.3 per cent/year for HFC-134a from domestic refrigeration and 15.0 per cent/year for mobile air conditioning. The product life factor for stationary air conditioning is reported to be 100 per cent/year. Monaco estimates emissions of HFCs based on the EFs used by France. However, the respective values for domestic refrigeration, and stationary and mobile air conditioning are 0.01, 8.26 and 9.72 per cent/year, respectively. The ERT considers that the values used by Monaco are not properly justified and could potentially lead to an overestimation of HFC-134a emissions. Monaco explained that it uses the value of 15 per cent/year for mobile air conditioning so as to avoid the underestimation of emissions of HFC-134a. The ERT recommends that Monaco justify and explain in its next annual submission the use of the product life factors in order to increase the transparency and accuracy of its reporting.

49. PFC emissions from stocks are reported for the period 2001–2009 only; for the remaining years of the time series the notation keys "IE", "NA", "NO" are used. The NIR is not explicit in terms of the trend for the PFC gases. The ERT recommends that Monaco improve the transparency of the reporting on the industrial processes sector by including information on the trend of the use of PFCs, and that the Party ensure that the information collected on PFCs is complete and, even if no emissions from manufacturing are occurring, ensure that all emissions from stock and disposal are included or an explanation for the lack of emissions is provided.

50. Monaco reports SF_6 emissions from electrical equipment in CRF table 2(II), but the emissions were not included in the background data CRF table 2(II).F in the initial submission in 2014. The ERT noted that the Party corrected this inconsistency in the resubmitted CRF tables. The ERT commends the Party for this improvement and recommends that Monaco strengthen the QA/QC activities before submitting the annual inventory.

51. The ratio of potential/actual SF_6 emissions is very unstable and the inter-annual changes range between –80.7 per cent (2004–2005) and +167.2 per cent (1991–1992). The ratio is between 2.95 and 0.41 and the 2012 value is 0.77 (19.4 per cent above the 2011 value). Similar changes are also observed for HFCs. Monaco attributed the inter-annual fluctuations to the change of electrical equipment in 2004. The ERT encourages Monaco to provide further explanatory information on these fluctuations in order to increase transparency of its reporting.

3. Non-key categories

Asphalt roofing – CO_2

52. Monaco continues to report CO_2 emissions from asphalt roofing as "NE" in its 2014 annual submission. The ERT considers that data could be collected in a small country such as Monaco and that the emissions could easily be estimated. Therefore, the ERT reiterates the previous encouragement that Monaco estimate the emissions from this category.

Solvent and other product use – CO_2 and N_2O

53. Monaco did not estimate N_2O emissions for solvent and other product use except for aerosol cans, and the notation key "NE" was used to report the remaining categories. The AD for use of N_2O from anaesthesia, fire extinguishers and other uses are reported as "NO", while the AD for printing industry and wood preservation are reported with emissions and the AD for degreasing and dry cleaning are reported as "NE" owing to a lack of data. The ERT encourages the Party to consider collecting further information in its annual survey and to estimate these emissions in future annual submissions to increase the completeness of the inventory. The ERT encourages Monaco to check at the only hospital in the country (the Centre Hospitalier Princesse Grace – Monaco) for any use of N_2O for anaesthesia and to report thereon.

54. Monaco reports constant N_2O emissions from aerosol cans (solvent and other product use) (0.0001 Gg) using the EF of France. The ERT recommends that the Party justify the application of the EF and verify the applicability of constant emissions across the time series.

55. The CO_2 implied emission factor (IEF) for paint application shows large deviations over the time period within the range 0.27 to 0.94 t/t. The 2012 value (0.39 t/t) is 55.9 per cent lower than the 1990 value (0.86 t/t). The NIR explains that the information on the category is based on the country-specific data, but does not explain the deviation in the trend. The ERT recommends that Monaco include such information in the NIR to improve the transparency of the reporting.

D. Agriculture

Sector overview

56. The emissions from the agriculture sector are reported as "NO" and "NA" for all categories and years. The NIR indicates that, given the lack of animal breeding and pastures in the country, the emissions from the sector could be assumed to be non-existent.

57. Monaco has not made any recalculations between the 2013 and 2014 annual submissions for this sector.

E. Land use, land-use change and forestry

1. Sector overview

58. In 2012, net removals from the LULUCF sector amounted to 0.02 Gg CO_2 eq. Since 1990, net removals have increased by 66.6 per cent. The key driver for the rise in removals is the increase in the total area of green space from 38.91 ha in 1990 to 44.32 ha in 2012, and the decrease in the amount of fertilizer used in public parks and gardens from 2,155 t to 1,764 t. Within this sector, only CO_2 removals and N_2O emissions from settlements remaining settlements are reported. The remaining categories are reported as "NO" or "NE" (see paras. 60 and 61 below).

59. Monaco has not made any recalculations between the 2013 and 2014 annual submissions for this sector.

60. The reporting of the LULUCF sector is not complete for some non-mandatory categories. CO_2 emissions from the dead organic matter and soil organic carbon pools for settlements remaining settlements are reported as "NE". As the IPCC *Good Practice Guidance for Land Use, Land-Use Change and Forestry* (hereinafter referred to as the IPCC good practice guidance for LULUCF) does not provide methodological guidance to estimate these emissions, the reporting of carbon stock changes in these pools for settlements remaining settlements is not mandatory. However, given the importance of settlements to Monaco's LULUCF sector inventory, the ERT encourages the Party to provide estimates of as many pools as possible under settlements in future annual submissions.

61. Monaco uses the notation key "NO" when reporting emissions associated with biomass burning. However, information is available on the incineration of wastes from maintenance of parks and gardens under energy production. The information included in the NIR on emissions from biomass burning of green waste from the pruning of trees in national parks is not sufficiently transparent. The emissions have been misallocated between the LULUCF, waste and energy sectors without proper notification (e.g. use of the notation key "IE"). The ERT strongly reiterates the recommendation made in the previous review reports that Monaco provide more transparent information on the calculation of emissions from the burning of biomass of green waste to ensure the consistency of the information reported and on the allocation of emissions and carbon stock changes between the LULUCF, waste and energy sectors.

2. Non-key categories

Settlements remaining settlements – CO_2 and N_2O

62. In its initial submission in 2014, Monaco reported only the carbon stock gains from living biomass in green spaces (parks and public gardens), while the losses were reported as "NA". During the review, Monaco resubmitted its inventory with a change in CRF table 5.E, reporting losses of carbon stock in living biomass as "IE". Monaco explained that the carbon losses from the trimming and pruning of trees are reported together with "gains of carbon stock", resulting in a net gain of carbon stock in living biomass. The ERT commends Monaco for the improved transparency of its reporting.

63. Monaco reported the carbon stock changes in settlements remaining settlements using a tier 1a method (crown cover area method) provided in appendix 3a.4 to the IPCC good practice guidance for LULUCF. Monaco used country-specific data to estimate the total crown cover area, based on the total number of trees and the area of green parks. The previous ERT encouraged Monaco to use information from aerial photographs to estimate the crown cover, but the Party explained that, owing to limited resources and the fact that settlements is not a key category, the implementation of the encouragement is not a priority. The ERT noted that since Monaco already has remotely sensed data available, it could

explore its adequacy to provide a more accurate estimate of the crown cover area, to the extent possible. The ERT therefore recommends that Monaco provide the relevant information when applying a tier 1a method, to increase the transparency of the reporting.

64. Monaco has indicated that the tier 1a equation has been applied only to those trees with an average age less than or equal to 20 years old, which corresponds to 15 per cent of the total active biomass. It is not clear how Monaco has applied this information to estimate the net removals from settlements remaining settlements and if the gains from the annual biomass growth have been assumed to offset the annual losses from pruning and mortality, in the case of trees older than 20 years. Monaco did not respond to the request for clarification raised by the ERT during the review on this issue. Also, since trees less than 20 years old have been identified in parks and gardens, the ERT requested that the Party clarify whether these were scattered in the country or were part of a larger planted area, in which case Monaco should report them as land converted to settlements, and not as settlements remaining settlements.

65. Monaco has also reported N_2O emissions from fertilizer application in parks and gardens, totalling 0.017 Gg CO_2 eq. The ERT noted that Monaco continues to report the estimates only in CRF table 5 and the data are not included in the background data table for direct N_2O emissions from nitrogen fertilization of forest land and other (CRF table 5(I)) under "other", as recommended in previous review reports. The NIR also lacks transparency and does not include the data necessary for the review process; the methodology used for the estimation of N_2O emissions was not sufficiently documented in the NIR. The ERT reiterates the recommendations made in the previous review reports that the Party ensure the consistent and transparent reporting of the emission estimates, and encourages Monaco to provide as much information as possible in the NIR.

F. Waste

1. Sector overview

66. In 2012, emissions from the waste sector amounted to 1.29 Gg CO_2 eq, or 1.4 per cent of total GHG emissions. Since 1990, emissions have increased by 71.4 per cent. The key drivers for the rise in emissions are the increase in the amount of sludge incineration and the increase in emissions from human sewage as a result of the growing population. Within the sector, 65.6 per cent of the emissions were from wastewater handling, followed by 34.4 per cent from waste incineration. There are no waste disposal sites in Monaco; therefore, emissions from solid waste disposal on land do not occur.

67. Monaco has made recalculations between the 2013 and 2014 annual submissions for this sector. The recalculation made by Monaco between the 2013 and 2014 annual submissions was in the following category: N_2O emissions from wastewater handling. The recalculation was made in response to the 2010 annual review report to update the protein consumption for the years 1990–2011 using data provided by the Direction de l'Action Sanitaire et Sociale de Monaco. Compared with the 2013 annual submission, the recalculation decreased emissions in the waste sector by 0.02 Gg CO_2 eq (1.5 per cent), and decreased total national emissions for 2011 by 0.02 per cent. The recalculation was adequately explained, but was not included in section 10 of the NIR where the recalculations for the inventory are summarized. The ERT recommends that Monaco improve the internal consistency of its next NIR.

68. The inventory for the waste sector is complete. It covers emissions from the waste management practices existing in the country. The information provided in the NIR together with the information provided by the Party during the in-country review was generally sufficiently transparent for the ERT to understand how the emissions were

estimated in the waste sector. The recommendations from the previous review related to improvements of the information provided in the NIR have been implemented in the 2014 inventory submission. The ERT commends the Party for the improvements.

69. No category was identified as a key category in the waste sector, owing to the small contribution of the sector to the Party's total GHG emissions.

2. Non-key categories

Wastewater handling – N_2O

70. Only N_2O emissions from human sewage are reported under this category. There are no separate industrial wastewater treatment plants in Monaco and industrial wastewater is treated in the same treatment plant as human sewage. The single wastewater treatment plant is aerobic and therefore no CH_4 emissions occur.

71. In the synthesis and assessment report, it was identified that there are two values for protein consumption (human sewage) reported over the time series: 32.30 kg/person/year used for the years 1990–2005 and 30.11 kg/person/year used for the years 2006–2012 (a drop of 6.8 per cent). These values for protein consumption are consistent with the national data on protein consumption that Monaco has started to use, based on the recommendations made in previous review reports.

Waste incineration – CH_4 and N_2O

72. Monaco reports AD and emissions from the incineration of non-biogenic waste as "NA" in CRF table 6.C. The incineration of non-biogenic waste is reported in the energy sector. Therefore, the notation key "IE" would be more appropriate to clarify that these emissions are included in another sector. Monaco already explains this fact in the documentation box of CRF table 6.C. The ERT recommends that Monaco change the notation keys used accordingly.

G. Supplementary information required under Article 7, paragraph 1, of the Kyoto Protocol

1. Information on activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol

Overview

73. Table 6 provides an overview of the information reported and parameters selected by Monaco under Article 3, paragraphs 3 and 4, of the Kyoto Protocol.

Table 6
Supplementary information reported under Article 3, paragraphs 3 and 4, of the Kyoto Protocol

Issue	*Expert review team assessment, if applicable*	*Findings and recommendations*
Assessment of Monaco's reporting in accordance with the requirements in paragraphs 5–9 of the annex to decision 15/CMP.1	Sufficient	Monaco reports all activities under Article 3, paragraph 3, of the Kyoto Protocol as "NO" as there are no lands subject to KP-LULUCF activities according to the definition of forest selected by the Party. Monaco did not elect any activities under Article 3, paragraph 4, of the Kyoto Protocol

Issue	*Expert review team assessment, if applicable*	*Findings and recommendations*
Activities elected under Article 3, paragraph 4, of the Kyoto Protocol	None	
Period of accounting	Annual accounting	
Monaco's ability to identify areas of land and areas of land-use change in accordance with paragraph 20 of the annex to decision 16/CMP.1	Sufficient	

Abbreviations: KP-LULUCF = land use, land-use change and forestry emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, NO = not occurring

74. Section G.1 includes the ERT's assessment of the 2014 annual submission against the Article 8 review guidelines and decisions 15/CMP.1 and 16/CMP.1. In accordance with decision 6/CMP.9, Parties will begin reporting of KP-LULUCF activities in the submissions due by 15 April 2015 using revised CRF tables, as contained in the annex to decision 6/CMP.9. Owing to this change in the CRF tables for KP-LULUCF activities, and the change from the first commitment period to the second commitment period, paragraphs 75-77 below contain the ERT's assessment of the Party's adherence to the current guidelines for reporting and do not provide specific recommendations for reporting of these activities for the 2015 annual submission.

75. The ERT noted that Monaco has not implemented the recommendation made in the previous review report that the Party compare the time series of orthophotos from the years 1991, 1995, 1999, 2004 and 2009 to demonstrate that no afforestation, reforestation and deforestation occurs in the country using the forest definition adopted. Monaco has indicated in the NIR (as well as in the initial report under the Kyoto Protocol) that none of the green spaces in the country (parks, public gardens, private gardens and some natural areas) meet the definition of forest. The Party has also provided information in the NIR that no trees may be removed without the approval of the Town Planning and Construction Department and that in 2005 an exhaustive survey of all trees in the Principality of Monaco was conducted. The analysis of the aerial photographs included in the NIR allows the ERT to broadly verify the status of the green areas that appear not to have expanded or contracted since 1991. However, the scale of the information provided in the NIR is limited, which could have been prevented if Monaco had carried out a comparison of time-series geographic distributions, as recommended by the previous ERT. Nevertheless, after consulting other sources[16] and analysing the orthophotos and the information provided by Monaco in the NIR, the ERT agreed that Monaco has provided sufficient information in accordance with the requirements in paragraphs 5–9 of the annex to decision 15/CMP.1.

[16] United Nations Economic Commission for Europe, Forest Europe, Food and Agriculture Organization of the United Nations. 2011. *State of Europe's Forests 2011: Status and Trends in Sustainable Forest Management in Europe*. <http://www.foresteurope.org/documentos/State_of_Europes_Forests_2011_Report_Revised_November_2011.pdf>.

Activities under Article 3, paragraph 3, of the Kyoto Protocol

Afforestation and reforestation – CO_2

76. In its initial submission, Monaco set the definition of forest as a minimum area of 0.5 ha, with a minimum canopy cover equal to 10 per cent and a minimum height equal to 5 m, in line with decision 16/CMP.1, annex, paragraph 1(a). In its 2014 annual submission, Monaco reported that no afforestation and/or reforestation occurs in the country, and that the trees planted in urban areas do not reach the forest thresholds defined by Monaco in its definition of forest. Monaco indicated that the potential area includes only public parks and public and private gardens which are not forests but are considered under settlements. These areas are reported under other land in table NIR-2 with a value of 0.20 kha for the years 2008–2012.

Deforestation – CO_2

77. Monaco reported that there is no land in the national territory that meets the definition of forest (see para. 75 above); hence, deforestation does not occur. Similarly to afforestation and reforestation, Monaco has provided some aerial photographs in the NIR for the years 1991, 1999, 2004 and 2009, where it can be noted that areas with tree cover have been maintained as far as the scale of the photographs allows an assessment.

Activities under Article 3, paragraph 4, of the Kyoto Protocol

78. Monaco did not elect any activities under Article 3, paragraph 4, of the Kyoto Protocol.

2. Information on Kyoto Protocol units

Standard electronic format and reports from the national registry

79. Monaco has reported information on its accounting of Kyoto Protocol units in the required SEF tables, as required by decisions 15/CMP.1 and 14/CMP.1. The ERT took note of the findings and recommendations included in the standard independent assessment report (SIAR) on the SEF tables and the SEF comparison report.[17] The SIAR was forwarded to the ERT prior to the review, pursuant to decision 16/CP.10. The ERT reiterated the main findings and recommendations contained in the SIAR.

80. Information on the accounting of Kyoto Protocol units has been prepared and reported in accordance with decision 15/CMP.1, annex, chapter I.E, and reported in accordance with decision 14/CMP.1 using the SEF tables. This information is consistent with that contained in the national registry and with the records of the international transaction log (ITL) and the clean development mechanism registry and meets the requirements referred to in decision 22/CMP.1, annex, paragraph 88(a–j). No discrepancy has been identified by the ITL and no non-replacement has occurred. The national registry has adequate procedures in place to minimize discrepancies.

Accounting of activities under Article 3, paragraph 3, of the Kyoto Protocol and any elected activities under Article 3, paragraph 4, of the Kyoto Protocol

81. Monaco has reported information on its accounting of KP-LULUCF in the accounting table, as included in the annex to decision 6/CMP.3. Information on the accounting of KP-LULUCF has been prepared and reported in accordance with decisions

[17] The SEF comparison report is prepared by the international transaction log (ITL) administrator and provides information on the outcome of the comparison of data contained in the Party's SEF tables with corresponding records contained in the ITL.

16/CMP.1 and 6/CMP.3. Consistent with the KP-LULUCF tables, all KP-LULUCF activities in the accounting table are reported as "NA".

82. Table 7 shows the accounting quantities for KP-LULUCF as reported by the Party and the final values after the review.

Table 7

Accounting quantities for activities under Article 3, paragraph 3, and, if any, activities under Article 3, paragraph 4, of the Kyoto Protocol, in t CO_2 eq

	2014 annual submission[a]		*2010, 2011, 2012 and 2013 annual submissions*[b]	*Net accounting quantity*[c]
	As reported	*Revised estimates*	*Final*	*Final*	
Afforestation and reforestation	NA		NA	NA	NA
Non-harvested land	NA		NA	NA	NA
Harvested land	NA		NA	NA	NA
Deforestation	NA		NA	NA	NA
Forest management					
Article 3.3 offset[d]	NA		NA	NA	NA
Forest management cap[e]	NA		NA	NA	NA
Cropland management	NA		NA	NA	NA
Grazing land management	NA		NA	NA	NA
Revegetation	NA		NA	NA	NA

Abbreviations: CRF = common reporting format, KP-LULUCF = land use, land-use change and forestry emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, NA = not applicable.

[a] The values included under the 2014 annual submission are the cumulative accounting values for 2008, 2009, 2010, 2011 and 2012, as reported in the accounting table of the KP-LULUCF CRF tables for the inventory year 2012.

[b] The values included under the 2010, 2011, 2012 and 2013 annual submissions are the final accounting values as a result of the 2013 review and are included in table 7 of the 2013 annual review report (FCCC/ARR/2013/MCO, page 29) in the column "2013 annual submission", "Final".

[c] The "net accounting quantity" is the quantity of Kyoto Protocol units that the Party shall issue or cancel under each activity under Article 3, paragraph 3, and paragraph 4, if relevant, based on the final accounting quantity in the 2014 annual submission and where the quantities issued or cancelled based on the 2013 annual review report have been subtracted ("net accounting quantity" = final 2014 – final 2013 annual review report).

[d] "Article 3.3 offset": for the first commitment period, a Party included in Annex I to the Convention that incurs a net source of emissions under the provisions of Article 3, paragraph 3, of the Kyoto Protocol may account for anthropogenic greenhouse gas emissions by sources and removals by sinks in areas under forest management under Article 3, paragraph 4, up to a level that is equal to the net source of emissions under the provisions of Article 3, paragraph 3, but not greater than 9.0 megatonnes of carbon times five, if the total anthropogenic greenhouse gas emissions by sources and removals by sinks in the managed forest since 1990 is equal to, or larger than, the net source of emissions incurred under Article 3, paragraph 3.

[e] In accordance with decision 16/CMP.1, annex, paragraph 11, for the first commitment period only, additions to and subtractions from the assigned amount of a Party resulting from forest management under Article 3, paragraph 4, of the Kyoto Protocol after the application of decision 16/CMP.1, annex, paragraph 10, and resulting from forest management project activities undertaken under Article 6, shall not exceed the value inscribed in the appendix of the annex to decision 16/CMP.1, times five.

83. Based on the information provided in table 7 for the activity afforestation and reforestation, Monaco shall not issue or cancel any Kyoto Protocol units in its national registry.

84. Based on the information provided in table 7 for the activity deforestation, Monaco shall not issue or cancel any Kyoto Protocol units in its national registry.

Calculation of the commitment period reserve

85. Monaco has reported its commitment period reserve in its 2014 annual submission. The Party reported its commitment period reserve to be 467,329 t CO_2 eq based on the national emissions in its most recently reviewed inventory (93.47 Gg CO_2 eq) although showing that the value was above the value set in the initial report review. The ERT disagrees with this figure. The ERT's calculation of the commitment period reserve is 445,699 t CO_2 eq as it is based on the assigned amount and not the most recently reviewed inventory.

3. Changes to the national system

86. Monaco reported that there are no changes in its national system since the previous annual submission (the last change occurred in 2012). However, in response to a question raised by the ERT during the review regarding the measures undertaken to ensure timely submissions, Monaco reported a minor change in its national system, consisting of the renewal of the contract of assistance with CITEPA, in order to strengthen the procedures used for the preparation of the inventory and to improve the drafting of the NIR, as well as ongoing efforts to ensure assistance from external consultants to improve the quality and timeliness of inventory submissions. The ERT concluded that the Party's national system continues to be in accordance with the requirements of national systems outlined in decision 19/CMP.1. The ERT recommends that the Party report in its annual submission any change(s) in its national system in accordance with decision 15/CMP.1, annex, chapter I.F.

4. Changes to the national registry

87. Monaco reported that there is a change in its national registry since the previous annual submission. In the NIR, the Party described the change, consisting of a change in the responsibility for the registry. The ERT concluded that, taking into account the confirmed change in the national registry, Monaco's national registry continues to perform the functions set out in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1 and continues to adhere to the technical standards for data exchange between registry systems in accordance with relevant decisions of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (CMP). The ERT recommends that the Party report in its annual submission any change(s) in its national registry in accordance with decision 15/CMP.1, annex, chapter I.G.

88. The ERT noted the reiterated recommendation in the SIAR that Monaco make all non-confidential information related to the national registry publicly available pursuant to paragraphs 45, 46, 47 and 48 of the annex to decision 13/CMP.1, as detailed in the SIAR, and that the Party report on any changes to that public information.

5. Minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol

89. Consistent with paragraph 23 of the annex to decision 15/CMP.1, Monaco provided information relating to how it is striving, under Article 3, paragraph 14, of the Kyoto Protocol, to implement its commitments in such a way as to minimize adverse social, environmental and economic impacts on developing country Parties, particularly those

identified in Article 4, paragraphs 8 and 9, of the Convention. The Party stated that it was not possible to assess the effects of its policies concerning the energy sector, and in particular their impact on developing country Parties. Monaco also provided updated information on the activities carried out in cooperation with Tunisia under the bilateral agreement on the clean development mechanism, consisting of the launch of a new activity regarding the preparation of nationally appropriate mitigation actions (NAMAs).

90. In its NIR submitted on 4 September 2014, Monaco included a section related to a change in its reporting of the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol since the previous annual submission and reported the continuation of the activities reported in the previous annual submission. The ERT concluded that, taking into account the confirmed change in the reporting, the information provided is complete and transparent.

III. Conclusions and recommendations

A. Conclusions

91. Table 8 summarizes the ERT's conclusions on the 2014 annual submission of Monaco, in accordance with the Article 8 review guidelines.

Table 8
Expert review team's conclusions on the 2014 annual submission of Monaco

Issue	*Expert review team assessment*	*Paragraph cross references for identified problems*
The ERT concludes that the inventory submission of Monaco is complete with regard to categories, gases, years and geographical boundaries and contains both an NIR and CRF tables for 1990–2012		
Annex A sources[a]	Complete	
LULUCF[a]	Complete	
KP-LULUCF	Complete	
The ERT concludes that the inventory submission of Monaco has been prepared and reported in accordance with the UNFCCC reporting guidelines	Generally	See table 5
Monaco's inventory is in accordance with the Revised 1996 IPCC Guidelines, the IPCC good practice guidance and the IPCC good practice guidance for LULUCF	Generally	See paragraphs 17, 19, 24, 35, 47
The submission of information required under Article 7, paragraph 1, of the Kyoto Protocol has been prepared and reported in accordance with decision 15/CMP.1	Yes	85
Monaco has reported information on its accounting of Kyoto Protocol units in accordance with decision 15/CMP.1, annex, chapter I.E, and used the required reporting format tables as specified by decision 14/CMP.1	Yes	
The national system continues to perform its required	Yes	

Issue	*Expert review team assessment*	*Paragraph cross references for identified problems*
functions as set out in the annex to decision 19/CMP.1		
The national registry continues to perform the functions set out in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1 and continues to adhere to the technical standards for data exchange between registry systems in accordance with relevant CMP decisions	Yes	
Did Monaco provide information in the NIR on changes in its reporting of the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol?	Yes	

Abbreviations: Annex A sources = source categories included in Annex A to the Kyoto Protocol, CMP = Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol, CRF = common reporting format, ERT = expert review team, IPCC = Intergovernmental Panel on Climate Change, IPCC good practice guidance = IPCC *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories*, IPCC good practice guidance for LULUCF = IPCC *Good Practice Guidance for Land Use, Land-Use Change and Forestry*, KP-LULUCF = LULUCF emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol, LULUCF = land use, land-use change and forestry, NIR = national inventory report, Revised 1996 IPCC Guidelines = *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories*, UNFCCC reporting guidelines = "Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual inventories".

[a] The assessment of completeness by the ERT considers only the completeness of reporting of mandatory categories (i.e. categories for which methods and default emission factors are provided in the Revised 1996 IPCC Guidelines, the IPCC good practice guidance or the IPCC good practice guidance for LULUCF).

B. Recommendations

92. The ERT identified the issues for improvement listed in table 9. All recommendations are for the next annual submission, unless otherwise specified.

Table 9
Recommendations identified by the expert review team

Sector	*Category/ cross-cutting issue*	*Recommendation*	*Reiteration of previous recommendation? (Yes or No)*	*Paragraph cross references*
Cross-cutting		Submit all the elements of its next inventory by 15 April 2015	No	7
	Quality assurance/quality control	Strengthen its QA/QC and verification procedures in order to avoid the occurrence of errors and inconsistencies in the reporting	Yes	Table 4, 40
		Amend annex 8 of the NIR with information on the QA/QC and verification procedures implemented for each of the sectors	No	15
		Revise the organization of the QA activities, taking into account that these should not be carried out by experts involved in the preparation	Yes	19

Sector	*Category cross-cutting issue*	*Recommendation*	*Reiteration of previous recommendation? (Yes or No)*	*Paragraph cross references*
		of the inventory		
	Transparency	Improve the transparency of the NIR	Yes	table 3, paragraphs 13, 14, 32, 47, 48, 49, 55, 61, 63–65 and 72
	Recalculations and time series consistency	Report the recalculations under each category and include a clear explanation of the rationale for and impact of the recalculations on the emission levels and trends in the NIR. Include relevant summary information in CRF table 8(b)	No	13
	Inventory planning	Strengthen cooperation with national institutions and companies in order to increase the use of available country-specific data for the preparation of the inventory	Yes	17
		Continue updating and improving its QA/QC plan and provide information concerning the implementation of the QA/QC plan, in particular regarding the prioritization of inventory improvements on the basis of the key category analysis and the uncertainty assessment	Yes	18, 26
		Ensure that adequate resources are allocated to the preparation of the inventory	Yes	21
	Inventory preparation	Ensure consistent reporting of the key categories between the NIR and the CRF tables	No	23
		Use the 95 per cent confidence interval to report uncertainties	Yes	24
		Update and report information on the major sources of the uncertainty for the overall inventory and of the trend of the uncertainty	No	25
Energy	Transparency	Include additional information on the sector-specific QA/QC procedures performed, on the allocation of emissions between the energy and other sectors, and on the uncertainty values for the country-specific EFs	Yes	32
	Reference approach	Report the consumption of MSW in a consistent way in CRF tables 1.A(b) and 1.A(c)	Yes	34
		Explain the difficulties in the availability of data for completing the reference approach and try to collect these data in order to complete the	Yes	35

Sector	*Category cross-cutting issue*	*Recommendation*	*Reiteration of previous recommendation? (Yes or No)*	*Paragraph cross references*
		calculation of the reference approach		
	International bunker fuels	Repeat the survey used to separate emissions from international and domestic navigation on a regular basis	Yes	36
	Feedstocks and non-energy use of fuels	Revise the reporting of feedstocks and non-energy use of fuels in CRF table 1.A(d) in a consistent manner under the energy and industrial processes sectors	Yes	37
		Explain in the NIR the use and disposal of lubricants in the country	No	37
	Stationary combustion: liquid, gaseous and other fuels – CO_2, CH_4 and N_2O	Further investigate the possibility of collecting information on the composition of the MSW incinerated and determine a country-specific EF	Yes	38
		Subtract the biomass fraction in the MSW from other fuel and report it under the corresponding biomass fuel use	Yes	39
		Further investigate the origin of the CO_2 EF for natural gas and justify its use or modify it as necessary using country-specific data	Yes	41
		Make efforts to report the emissions from the commercial/institutional and residential subcategories separately	Yes	42
Industrial processes and solvent and other product use	Recalculations	Improve the reporting on the recalculations by ensuring that the information is updated and by including information on the rationale for and impact of the recalculations	No	45
	QA/QC	Further develop the QA/QC procedures for all categories and strengthen the QC before submitting the annual inventory	Yes	47, 50
		Report more clearly on the questionnaires used to collect data for consumption of halocarbons and SF_6 and on any QA/QC and verification procedures applied to the data	No	47
	Consumption of halocarbons and SF_6 – HFCs, PFCs and SF_6	Justify and explain the product life factors used	No	48

Sector	*Category cross-cutting issue*	*Recommendation*	*Reiteration of previous recommendation? (Yes or No)*	*Paragraph cross references*
		Include information on the trend of the use of PFCs, ensure that the information collected on PFCs is complete and any emissions from stock and disposal are included or an explanation for the lack of emissions is provided	No	49
	Solvent and other product use – CO_2 and N_2O	Justify the application of the N_2O EF for aerosol cans and verify the applicability of constant emissions across the time series	No	54
		Explain the deviation in the trend of CO_2 IEF for paint application	No	55
LULUCF	Transparency	Provide more transparent information on biomass burning and on the allocation of emissions and carbon stock changes between the LULUCF, waste and energy sectors	Yes	61
	Settlements remaining settlements – CO_2	Improve methodological information on tier 1a method applied	Yes	63
	Direct N_2O emissions from nitrogen fertilization – N_2O	Ensure the consistent and transparent reporting of the emission estimates from direct N_2O emissions from nitrogen fertilization	Yes	65
Waste	Recalculations, QA/QC	Improve the internal consistency on reported recalculation in the NIR	No	67
	Waste incineration – CH_4, N_2O	Correct the notation key used for incineration of non-biogenic waste	No	72
National system		Report any changes in its national system	No	86
National registry		Make all non-confidential information related to the national registry publicly available and report on any changes to that public information	Yes	87, 88

Abbreviations: CRF = common reporting format, EF = emission factor, IEF = implied emission factor, LULUCF = land use, land-use change and forestry, MSW = municipal solid waste, NIR = national inventory report, QA/QC = quality assurance/quality control.

IV. Questions of implementation

93. No questions of implementation were identified by the ERT during the review.

Annex I

Information to be included in the compilation and accounting database

Table 10

Information to be included in the compilation and accounting database in t CO_2 eq for 2012, including the commitment period reserve

	As reported	*Revised estimates*	*Adjustment*[a]	*Final*[b]
Commitment period reserve	467 329	445 699		445 699
Annex A emissions for 2012				
CO_2	83 217			83 217
CH_4	763	767		767
N_2O	2 930			2 930
HFCs	6 392			6 392
PFCs	IE, NA, NO			IE, NA, NO
SF_6	164			164
Total Annex A sources[c]	**93 466**	**93 470**		**93 470**
Activities under Article 3, paragraph 3, for 2012				
3.3 Afforestation and reforestation on non-harvested land for 2012	NA			NA
3.3 Afforestation and reforestation on harvested land for 2012	NA			NA
3.3 Deforestation for 2012	NA			NA
Activities under Article 3, paragraph 4, for 2012[d]				
3.4 Forest management for 2012				
3.4 Cropland management for 2012				
3.4 Cropland management for the base year				
3.4 Grazing land management for 2012				
3.4 Grazing land management for the base year				
3.4 Revegetation for 2012				
3.4 Revegetation for the base year				

Abbreviations: Annex A sources = source categories included in Annex A to the Kyoto Protocol, IE = included elsewhere, NA = not applicable, NO = not occurring.

[a] "Adjustment" is relevant only for Parties for which the expert review team has calculated one or more adjustment(s).

[b] "Final" includes revised estimates, if any, and/or adjustments, if any.

[c] The values for "Total Annex A sources" in the columns "As reported", "Revised estimates" and "Final" may not equal the sum of the values for the gases in those columns owing to rounding.

[d] Activities under Article 3, paragraph 4, are relevant only for Parties that elected one or more such activities.

Table 11

Information to be included in the compilation and accounting database in t CO_2 eq for 2011

	As reported	*Revised estimates*	*Adjustment*[a]	*Final*[b]
Annex A emissions for 2011				
CO_2	79 199			79 199
CH_4	732	736		736
N_2O	2 731			2 731
HFCs	6 988			6 988
PFCs	IE, NA, NO			IE, NA, NO
SF_6	163			163
Total Annex A sources[c]	**89 812**	**89 816**		**89 816**
Activities under Article 3, paragraph 3, for 2011				
3.3 Afforestation and reforestation on non-harvested land for 2011	NA			NA
3.3 Afforestation and reforestation on harvested land for 2011	NA			NA
3.3 Deforestation for 2011	NA			NA
Activities under Article 3, paragraph 4, for 2011[d]				
3.4 Forest management for 2011				
3.4 Cropland management for 2011				
3.4 Cropland management for the base year				
3.4 Grazing land management for 2011				
3.4 Grazing land management for the base year				
3.4 Revegetation for 2011				
3.4 Revegetation for the base year				

Abbreviations: Annex A sources = source categories included in Annex A to the Kyoto Protocol, IE= included elsewhere, NA = not applicable, NO = not occurring.

[a] "Adjustment" is relevant only for Parties for which the expert review team has calculated one or more adjustment(s).

[b] "Final" includes revised estimates, if any, and/or adjustments, if any.

[c] The values for "Total Annex A sources" in the columns "As reported", "Revised estimates" and "Final" may not equal the sum of the values for the gases in those columns owing to rounding.

[d] Activities under Article 3, paragraph 4, are relevant only for Parties that elected one or more such activities.

Table 12

Information to be included in the compilation and accounting database in t CO_2 eq for 2010

	As reported	*Revised estimates*	*Adjustment*[a]	*Final*[b]
Annex A emissions for 2010				
CO_2	82 431			82 431
CH_4	735	740		740
N_2O	2 754			2 754
HFCs	6 261			6 261
PFCs	IE, NA, NO			IE, NA, NO
SF_6	161			161
Total Annex A sources[c]	**92 342**	**92 346**		**92 346**
Activities under Article 3, paragraph 3, for 2010				
3.3 Afforestation and reforestation on non-harvested land for 2010	NA			NA
3.3 Afforestation and reforestation on harvested land for 2010	NA			NA
3.3 Deforestation for 2010	NA			NA
Activities under Article 3, paragraph 4, for 2010[d]				
3.4 Forest management for 2010				
3.4 Cropland management for 2010				
3.4 Cropland management for the base year				
3.4 Grazing land management for 2010				
3.4 Grazing land management for the base year				
3.4 Revegetation for 2010				
3.4 Revegetation for the base year				

Abbreviations: Annex A sources = source categories included in Annex A to the Kyoto Protocol, IE = included elsewhere, NA = not applicable, NO = not occurring.

[a] "Adjustment" is relevant only for Parties for which the expert review team has calculated one or more adjustment(s).

[b] "Final" includes revised estimates, if any, and/or adjustments, if any.

[c] The values for "Total Annex A sources" in the columns "As reported", "Revised estimates" and "Final" may not equal the sum of the values for the gases in those columns owing to rounding.

[d] Activities under Article 3, paragraph 4, are relevant only for Parties that elected one or more such activities.

Table 13

Information to be included in the compilation and accounting database in t CO_2 eq for 2009

	As reported	*Revised estimates*	*Adjustment*[a]	*Final*[b]
Annex A emissions for 2009				
CO_2	85 402			85 402
CH_4	756	760		760
N_2O	2 938			2 938
HFCs	6 138			6 138
PFCs	16			16
SF_6	163			163
Total Annex A sources[c]	**95 413**	**95 417**		**95 417**
Activities under Article 3, paragraph 3, for 2009				
3.3 Afforestation and reforestation on non-harvested land for 2009	NA			NA
3.3 Afforestation and reforestation on harvested land for 2009	NA			NA
3.3 Deforestation for 2009	NA			NA
Activities under Article 3, paragraph 4, for 2009[d]				
3.4 Forest management for 2009				
3.4 Cropland management for 2009				
3.4 Cropland management for the base year				
3.4 Grazing land management for 2009				
3.4 Grazing land management for the base year				
3.4 Revegetation for 2009				
3.4 Revegetation for the base year				

Abbreviations: Annex A sources = source categories included in Annex A to the Kyoto Protocol, NA = not applicable.

[a] "Adjustment" is relevant only for Parties for which the expert review team has calculated one or more adjustment(s).

[b] "Final" includes revised estimates, if any, and/or adjustments, if any.

[c] The values for "Total Annex A sources" in the columns "As reported", "Revised estimates" and "Final" may not equal the sum of the values for the gases in those columns owing to rounding.

[d] Activities under Article 3, paragraph 4, are relevant only for Parties that elected one or more such activities.

Table 14
Information to be included in the compilation and accounting database in t CO_2 eq for 2008

	As reported	*Revised estimates*	*Adjustment*[a]	*Final*[b]
Annex A emissions for 2008				
CO_2	90 070			90 070
CH_4	800	804		804
N_2O	3 050			3 050
HFCs	6 103			6 103
PFCs	16			16
SF_6	162			162
Total Annex A sources[c]	**100 202**	**100 206**		**100 206**
Activities under Article 3, paragraph 3, for 2008				
3.3 Afforestation and reforestation on non-harvested land for 2008	NA			NA
3.3 Afforestation and reforestation on harvested land for 2008	NA			NA
3.3 Deforestation for 2008	NA			NA
Activities under Article 3, paragraph 4, for 2008[d]				
3.4 Forest management for 2008				
3.4 Cropland management for 2008				
3.4 Cropland management for the base year				
3.4 Grazing land management for 2008				
3.4 Grazing land management for the base year				
3.4 Revegetation for 2008				
3.4 Revegetation for the base year				

Abbreviations: Annex A sources = source categories included in Annex A to the Kyoto Protocol, NA = not applicable.

[a] "Adjustment" is relevant only for Parties for which the expert review team has calculated one or more adjustment(s).

[b] "Final" includes revised estimates, if any, and/or adjustments, if any.

[c] The values for "Total Annex A sources" in the columns "As reported", "Revised estimates" and "Final" may not equal the sum of the values for the gases in those columns owing to rounding.

[d] Activities under Article 3, paragraph 4, are relevant only for Parties that elected one or more such activities.

Annex II

Documents and information used during the review

A. Reference documents

Intergovernmental Panel on Climate Change. *2006 IPCC Guidelines for National Greenhouse Gas Inventories*. Available at <http://www.ipcc-nggip.iges.or.jp/public/2006gl/index.html>.

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"Guidelines for the technical review of greenhouse gas inventories from Parties included in Annex I to the Convention". FCCC/CP/2002/8. Available at <http://unfccc.int/resource/docs/cop8/08.pdf>.

"Guidelines for national systems for the estimation of anthropogenic greenhouse gas emissions by sources and removals by sinks under Article 5, paragraph 1, of the Kyoto Protocol". Decision 19/CMP.1. Available at <http://unfccc.int/resource/docs/2005/cmp1/eng/08a03.pdf#page=14>.

"Guidelines for the preparation of the information required under Article 7 of the Kyoto Protocol". Decision 15/CMP.1. Available at <http://unfccc.int/resource/docs/2005/cmp1/eng/08a02.pdf#page=54>.

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Status report for Monaco 2014. Available at <http://unfccc.int/resource/docs/2014/asr/mco.pdf>.

Synthesis and assessment report on the greenhouse gas inventories submitted in 2014. Available at <http://unfccc.int/resource/webdocs/sai/2014.pdf>.

FCCC/ARR/2013/MCO. Report of the individual review of the annual submission of Monaco submitted in 2013. Available at <http://unfccc.int/resource/docs/2014/arr/mco.pdf>.

Standard independent assessment report template, parts 1 and 2. Available at <http://unfccc.int/kyoto_protocol/registry_systems/independent_assessment_reports/items/4061.php>.

B. Additional information provided by the Party

Responses to questions during the review were received from Mr. Philippe Antognelli (Direction de l'Environnement), including additional material on the methodology and assumptions used.

Annex III

Acronyms and abbreviations

AD	activity data
CH_4	methane
CMP	Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol
CO_2	carbon dioxide
CO_2 eq	carbon dioxide equivalent
CRF	common reporting format
EF	emission factor
ERT	expert review team
GHG	greenhouse gas; unless indicated otherwise, GHG emissions are the sum of CO_2, CH_4, N_2O, HFCs, PFCs and SF_6 without GHG emissions and removals from LULUCF
ha	hectare
HFCs	hydrofluorocarbons
IE	included elsewhere
IEF	implied emission factor
IPCC	Intergovernmental Panel on Climate Change
ITL	international transaction log
kg	kilogram (1 kg = 1,000 grams)
KP-LULUCF	land use, land-use change and forestry emissions and removals from activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol
LULUCF	land use, land-use change and forestry
MSW	municipal solid waste
N_2O	nitrous oxide
NA	not applicable
NE	not estimated
NIR	national inventory report
NO	not occurring
PFCs	perfluorocarbons
PJ	petajoule (1 PJ = 10^{15} joule)
QA/QC	quality assurance/quality control
SEF	standard electronic format
SF_6	sulphur hexafluoride
SIAR	standard independent assessment report
t	tonne (1 tonne = 1,000 kg)
TJ	terajoule (1 TJ = 10^{12} joule)
UNFCCC	United Nations Framework Convention on Climate Change